AMENDMENTS TO THE SPECIFICATION:

Please amend the paragraphs beginning at page 1, line 9, as follows:

~~CURRENT TECHNOLOGY~~BACKGROUND AND SUMMARY

~~A technique which is often used in~~ Some modern digital telecommunication systems are ~~is so-called~~ multi-carrier systems~~, in other words systems~~ where a number of carrier waves at different frequencies are used to transit information within ~~one and~~ the same time slot. A typical multi-carrier system comprises a central unit that handles the communication with and between a number of subscribers within a particular area. Such systems can also be used in, for example, office environments, in so-called LAN-systems (Local Area Network).

The multi-carrier technique ~~is a technique that~~ demands a relatively high power supply for transmission~~, among other things~~ because the amplifiers that are used in such systems have a low efficiency rating. Many types of equipment used for wireless communication in office environments, for example, portable computers and PDAs (Personal Digital Assistant) have power sources with extremely limited capacity, which means that it is difficult to use such equipment in multi-carrier systems. ~~In spite of this, it is of course~~ But it is still desirable ~~to be able~~ to use, for example, portable computers and PDAs for wireless communication ~~also~~ in systems where the multi-carrier technique is used.

~~DESCRIPTION OF THE INVENTION~~

~~The problem that is solved by the~~ The present invention ~~is thus to~~ makes it possible for equipment with a limited power supply to be incorporated in a multi-carrier system. ~~The invention solves this problem by providing a~~ A central unit for a multi-carrier system~~, which thus comprises~~ includes equipment for ~~the~~ receiving ~~reception of~~ a signal with multiple ~~consisting of a plurality of~~ carrier waves, and ~~which also comprises~~ equipment for receiving ~~reception of~~ a signal with one carrier wave (single-carrier)~~, where this~~ The one carrier wave is one of the carrier waves is~~that are~~ included in the multi-carrier system ~~for which the central unit is designed~~.

Please amend the paragraphs beginning at page 2, line 8, as follows:

Because single carrier ~~As transmission on a signal~~ frequency transmission can be carried out in a more energy-efficient way than multi-carrier transmission, ~~in this way it is possible for~~ equipment that cannot communicate with the central unit in a multi-carrier system on account of limitations in its power supply~~, to be able to~~ can nonetheless transmit to the central unit ~~in spite of this by~~ transmission on a single frequency. The reception of multi-carrier signals does not require as much power as transmission, which means that equipment ~~the~~ units with limited power can receive transmissions from the central unit in a multi-carrier system in the same way as other equipment units in the system. The fact that single-carrier units in the system transmit on one of the carrier waves that is already included in the multi-carrier system for which the central unit is designed means that the modifications that need to be made to a central unit to function according to the invention are small.

~~The fact that single-carrier units in the system transmit on one of the carrier waves that is included in the multi-carrier system for which the central unit is designed means that the modifications that need to be made to a central unit in order for it to be able to function according to the invention are as small as possible.~~

In addition to being provided with equipment for the reception of signals on a single carrier wave, ~~according to the invention~~ the central unit may ~~should~~ be equipped with a scheduler ~~means~~ for scheduling transmissions from a single-carrier unit in interaction with this unit. The interaction with the single-carrier equipment for the scheduling of its transmissions may ~~should suitably~~ be carried out by modifying~~ication of the~~ existing data frames ~~that are~~ used for scheduling communication within the multi-carrier system in which the central unit is incorporated. Single-carrier equipment is also provided that is equipped with means for scheduling its own transmissions to the central unit in interaction with a central unit in a multi-carrier system, preferably a central unit according to the invention.

Please delete the paragraph beginning at page 3, line 1:

~~According to the invention, single carrier equipment is also provided that is equipped with means for scheduling its own transmissions to the central unit in interaction with a central unit in a multi carrier system, preferably a central unit according to the invention.~~

Please amend the paragraphs beginning at page 3, line 11, as follows:

Figure 1 shows the construction of different carrier-waves in a multi-carrier system;~~, and~~

Figure 2 shows a MAC frame in a ~~known~~ multi-carrier system;~~, and~~

Figure 3 shows communication over different carrier waves in a device according to one example~~the invention;, and~~

Figure 4 shows a MAC frame in a system according to one example~~the invention;, and~~

Figure 5 shows a MAC frame in an alternative system according another example~~to the invention~~; and

Figure 6 shows a simplified function block diagram of an example central unit.

~~EMBODIMENTS~~DETAILED DESCRIPTION

The invention can be used in a large number of different types of system that use different types of multi-carrier modulation. But for purposes of illustration, ~~In~~ the following~~, the invention will be illustrated using such a system, the so called~~ description is in the non-limiting context of a Hiperlan/2 system~~,~~ which uses ~~so called~~ OFDM modulation, Orthogonal Frequency Division Multiplex. OFDM in Hiperlan/2 and IEEE 802.11a uses 48 different carrier waves for the transmission of data, as shown in Figure 1. In addition to the 48 carrier waves for data transmission, the system uses four pilot tones, which are shown in Figure 1 by broken lines and indicated with arrows. The pilot tones can, for example, be used for synchronization and measurement of signal strength. As also shown in Figure 1, the 48 carrier waves are evenly distributed over the frequency spectrum, except at the central frequency where there is no carrier wave.

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Please amend paragraph beginning at page 4, line 4, as follows:

Within the Hiperlan/2 system, there are one or more central units, e.g., ~~so-called~~ Access Points (AP), each of which handles the communication with and between a number of subscribers, mobile terminals (MT), within a particular area. The area's APs tell each MT when the MT ~~it~~ can receive data from the AP and when it can transmit data to the AP. All communication in the Hiperlan/2 system is structured in time using ~~so-called~~ MAC frames, Medium Access Control.

Please amend paragraphs beginning at page 5, line 1, as follows:

Figure 3 shows schematically one of the principles behind the invention. The system comprises a number, 1-N, of carrier waves. A number of these (in the Hiperlan/2 system four in number) are so-called pilot-tones, which are intended, for example, for synchronization of frequencies. In addition to the pilot tones, there is also a "gap", with no carrier wave, at the system's central frequency, the "zero frequency". As the central frequency in the system is not used, and the pilot tones are either unused or used to a minor extent, these frequencies may be used by one or more single-carrier units for transmission to the central unit in the system.

~~In addition to the pilot tones, there is also a "gap", with no carrier wave, at the system's central frequency, the "zero frequency". As the central frequency in the system is not used, and the pilot tones are either unused or used to a minor extent, according to the invention these frequencies are used by one or more single-carrier units for transmission to the central unit in the system.~~

~~In order to achieve the function according to the invention, b~~Both the central unit and the single-carrier unit(s) include a scheduler ~~should be provided with means~~ for scheduling the transmissions from the single-carrier unit to the central unit in interaction with each other. ~~This is carried out according to the invention by the~~ The central unit ~~partly having full functionality to~~

~~be able to~~ communicate~~s~~ with ~~the~~ "ordinary" multi-carrier units in the multi-carrier system using ~~by means of~~ the system's MAC frames~~,~~ and ~~also by it being provided with the ability to communicate~~ with the single-carrier units using modified MAC frames~~, as will be described below~~. Single-carrier units also communicate with the central unit using the modified MAC frames, as will also be described below. An example central unit is shown in Figure 6 in simplified function block form communicating with single carrier and/or subset carrier equipment. It includes a multi-wave carrier receiver, a single-carrier wave and/or subset carrier wave receiver, and a scheduler.

~~Single-carrier units (MT) according to the invention have been given the ability to communicate with the central unit (AP) using the modified MAC frames, as will also be described below.~~

Figure 4 shows an example of a modified MAC frame ~~according to the invention~~. The modification allows ~~comprises the introduction of the ability also for~~ single-carrier MTs to send a request ~~regarding being able~~ to transmit data, called RACH 2, where RACH 1 is the multi-carrier ~~"ordinary"~~ RACH ~~that has been~~ described ~~above~~ in connection with Figure 2. In addition, the MAC frame permits ~~has been modified so that~~ an AP to indicate to a ~~can also tell~~ single-carrier MTs that its ~~their~~ request ~~regarding being able~~ to transmit data (RACH 2) has been received by AP, which is carried out in RFCH 2, where RFCH 1 is the multi-carrier ~~"ordinary"~~ RFCH ~~that has been~~ described ~~above~~ in connection with Figure 2.

Please amend the paragraphs beginning at page 6, line 4, as follows:

The single-carrier units ~~suitably~~ send their request regarding transmission (RACH 2) on the central frequency, the "zero carrier wave", but transmit their data on one of the pilot tones. This means that the single-carrier units can transmit to and receive from the AP at the same time as the "ordinary" multi-carrier units~~, the multi-carrier units, in the system are communicating with the AP~~. In order for the single-carrier units ~~to be able~~ to transmit data to the AP on the pilot tones, the multi-carrier units should avoid using ~~not try to use~~ the same pilot tones at the same time. This can be arranged in various ~~two~~ ways, e.g., ~~either~~ by changing the standard or by the AP ~~in the system solving this by its~~ scheduling ~~of the~~ transmission of the respective units.

Preferably, not all single-carrier units send requests regarding transmission at the start of RACH 2. This can be achieved, for example, by any technique that spreads out the transmission requests in time, like "slotted ALOHA."

~~The system is suitably arranged in such a way that not all the single-carrier units in the system send requests regarding transmission at the start of RACH 2. This can be achieved by a number of techniques that spread out the transmission requests in time, for example, so called "slotted ALOHA", which techniques are familiar to experts in the field.~~

In order for the single-carrier units in the system to know when they can transmit their requests regarding transmission, they must know when RACH 2 commences in the relevant MAC frame. This information is suitably entered in each frame's FCCH, but can also be entered in the frame's BCCH. Each unit in the system has a "MAC-id", which the central unit in the system uses to identify information to and from the different units. If the information concerning the start time for RACH 2 is entered in FCCH, the information can suitably be entered as a separate MAC-id. This MAC-id does not correspond to any physical entity, but is a MAC-id that the single-carrier units listen for in order to obtain information from the central unit, for example concerning the start and stop times for RACH 2. Concerning the stop time for RACH 2, which coincides with the stop time for RACH 1, this can also be calculated by the single-carrier units based on the start time of the current frame, as all the MAC frames have the same duration. As shown in Figure 4, the start time for RACH 2 should coincide with the start time for DU, as this is the time when the central unit starts to listen for data from the units in the system.

~~Each unit in the system has its so called "MAC-id", which the central unit in the system uses to be able to identify information to and from the different units. If the information concerning the start time for RACH 2 is entered in FCCH, the information can suitably be entered as a separate MAC-id. This MAC-id does not correspond to any physical entity, but is a MAC-id that the single-carrier units listen for in order to obtain information from the central unit, for example concerning the start and stop times for RACH 2. Concerning the stop time for RACH 2, which coincides with the stop time for RACH 1, this can also be calculated by the single-carrier units,~~

~~based on the start time of the current frame, as all the MAC frames have one and the same duration.~~

Please amend the paragraphs beginning at page 7, line 6, as follows:

~~As shown in Figure 4, the start time for RACH 2 should coincide with the start time for DU, as this is the time when the central unit starts to listen out for data from the units in the system.~~

As mentioned above, there are ~~is a plurality of~~ different frequencies on which the single-carrier units ~~in a system according to the invention~~ can transmit data to the central unit ~~in the system~~. In FCCH~~,~~ for example, ~~FCCH~~ the central unit ~~should therefore~~ sends ~~out~~ information to every single-carrier unit regarding which frequency that particular unit is to transmit data on at the time it has been granted permission to transmit, i.e., a ~~so called~~ "Resource Grant". The information regarding which transmission frequency a particular unit has been allocated can be sent out in a number of ways in FCCH, for example, by using unused bits in FCCH in order to discuss this explicitly with the units, or by the unit's MAC-id being taken modulo N, where N is a predetermined number, for example the number of free frequencies that are available for transmission, in which case N will be equal to the number four in the Hiperlan/2 system.

Figure 5 shows an alternative MAC frame ~~that can be used in a variant of the invention. As shown in Figure 5, this alternative MAC frame is identical~~ similar to the one ~~that has been~~ described in connection with Figure 4, but with ~~the difference that~~ RFCH 2 is not included. ~~In this variant of the invention, e~~Corresponding information is sent instead to the single-carrier units in FCCH~~,~~ advising of ~~in other words information about~~ the start time for RACH 2 and ~~information about~~ whether the request regarding transmission has been received by the AP. This information is sent using a special MAC-id that is known by the single-carrier units, which MAC-id is reserved for this information. All information about all narrow-band units' RA feedback is under one and the same MAC-id~~,~~ as a ~~so called~~ bitmap.

Please amend the paragraph beginning at page 8, line 4, as follows:

In order for the central unit ~~in the system to be able~~ to receive both multi-carrier signals and single-carrier signals at the same time, the central units ~~according to the invention are~~ is modified

in comparison to traditional central units in multi-carrier systems. In one example ~~A suitable~~way of carrying out this modification, ~~is that~~ the central unit's existing receiver, ~~that is to say~~ (the part(s) that handle(s) the conversion of the signal), is not changed~~,~~. H~~h~~owever, a supplementary signal-processing function is introduced~~, the function of which is~~ to separate the signals that arrive from the single-carrier units from the signals that arrive from the multi-carrier units. This supplementary signal-processing function can be implemented in a large number of ways familiar to experts in the field, and is not an essential part of the present invention, for which reason it is not described here in greater detail.